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FOREST SERVICE

U.S. DEPARTMENT OF AGRICULTURE

ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Taper Table for Pole-Size Ponderosa Pines in Arizona and New Mexico

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Forest managers often need estimates of the number of posts or other piece products on a tract of forest land. Such estimates are complicated by the fact that pieces of several sizes may be equally merchantable. For example, posts vary in length and minimum top diameter; the size demanded depends on the end use.

The number of pieces in a tree can be determined from a table of tree diameters at various heights (table 1). Diameters are plotted over the corresponding heights, and the points are connected by smooth lines to form taper curves. The figure thus formed for any tree may then be subdivided into products of different lengths and diameters. Potential products are limited by the lengths and minimum top diameters accepted locally.

Several ways of dividing a tree may be tried to determine the method that will produce the most valuable combination of products. A table, similar to a standard volume table, can be prepared to show the number of pieces of each size in average trees of each diameter and height class. Such a table will show gross contents; a cull factor is needed for each tract to estimate the number of unacceptable pieces that will have to be deducted because of decay, crook, or fork.

Diameters for ponderosa pines in table 1 were computed from measurements of 139 trees obtained by personnel of the Southwestern Region, U. S. Forest Service. Sample trees were measured in all areas of commercial ponderosa pine in Arizona and New Mexico.

Table 1. Diameters at various heights of the average tree in each total height and diameter class, immature ponderosa pine in Arizona and New Mexico

Diameter :		Height above ground level in feet																				
breast height : Total :																						
outside bark : height :																						
(Inches)	(Feet)	1	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
Diameter inside bark in inches																						
5.5	30	5.4	4.6	4.1	3.7	3.2	2.4	1.6	0.7													
	40	5.4	4.6	4.2	3.9	3.7	3.3	2.9	2.2	1.5	0.8	0										
	30	6.2	5.4	4.8	4.3	3.8	3.0	2.0	0.8													
	40	6.2	5.4	4.8	4.4	4.1	3.8	3.3	2.5	1.8	0.9	0										
6.5	50	6.2	5.4	4.9	4.7	4.5	4.3	4.1	3.7	3.2	2.6	2.1	1.6	0.6								
	30	7.0	6.2	5.6	5.0	4.4	3.6	2.5	1.2													
	40	7.0	6.2	5.6	5.1	4.7	4.3	3.7	3.0	2.3	1.5	0										
	50	7.0	6.2	5.8	5.5	5.2	4.9	4.5	4.0	3.4	2.9	2.2	1.7	0.7								
7.5	60	7.0	6.3	5.9	5.6	5.5	5.4	5.1	4.8	4.5	4.0	3.5	3.0	2.4	1.9	1.1	0					
	30	7.9	7.0	6.4	5.7	5.1	4.3	3.2	1.9													
	40	7.9	7.0	6.4	5.8	5.4	4.9	4.3	3.6	2.9	2.0	0										
	50	7.9	7.1	6.6	6.3	5.9	5.6	5.1	4.6	3.9	3.4	2.6	2.0	0.9								
8.5	60	8.0	7.2	6.7	6.6	6.4	6.2	6.0	5.6	5.4	4.8	4.2	3.6	2.8	2.2	1.4	0					
	30	8.9	7.9	7.2	6.4	5.8	5.1	3.9	2.5													
	40	8.9	7.9	7.2	6.7	6.2	5.5	4.8	4.2	3.5	2.5	0										
	50	8.9	8.0	7.4	7.1	6.6	6.2	5.7	5.1	4.4	3.8	3.0	2.3	1.1								
9.5	60	9.0	8.1	7.7	7.4	7.2	6.9	6.6	6.3	5.9	5.5	4.8	4.1	3.2	2.5	1.7	0					
	30	8.9	7.9	7.2	6.4	5.8	5.1	3.9	2.5													
	40	8.9	7.9	7.2	6.7	6.2	5.5	4.8	4.2	3.5	2.5	0										
	50	8.9	8.0	7.4	7.1	6.6	6.2	5.7	5.1	4.4	3.8	3.0	2.3	1.1								
10.5	60	9.0	8.1	7.7	7.4	7.2	6.9	6.6	6.3	5.9	5.5	4.8	4.1	3.2	2.5	1.7	0					
	30	9.9	8.8	8.0	7.3	6.6	5.9	4.8	3.0													
	40	9.9	8.8	8.2	7.6	7.1	6.3	5.5	4.8	4.0	2.9	0										
	50	9.9	8.9	8.3	7.9	7.3	6.9	6.2	5.5	4.8	4.1	3.2	2.4	1.2								
11.5	60	10.0	8.9	8.4	8.1	7.7	7.3	6.8	6.4	5.9	5.7	5.1	4.3	3.4	2.6	1.8	0					
	70	10.1	9.0	8.6	8.3	8.0	7.8	7.6	7.2	6.8	6.4	6.0	5.5	4.8	4.0	3.3	2.5	1.7	0.6			
	30	10.8	9.8	8.9	8.1	7.4	6.6	5.3	3.2													
	40	10.8	9.8	9.1	8.5	7.9	6.9	6.0	5.2	4.2	3.0	0										
12.5	50	10.8	9.8	9.1	8.7	8.0	7.5	6.8	6.0	5.2	4.4	3.6	2.8	1.3								
	60	10.8	9.8	9.3	8.9	8.5	8.1	7.6	7.1	6.5	6.0	5.3	4.5	3.5	2.7	2.0	0					
	70	10.9	9.9	9.4	9.2	9.0	8.6	8.4	8.0	7.8	7.4	6.9	6.1	5.3	4.5	3.7	2.8	2.0	0.9			
	30	11.8	10.7	9.9	8.9	8.1	7.0	5.6	3.3													
12.5	40	11.8	10.7	10.0	9.3	8.6	7.5	6.4	5.4	4.3	3.1	0										
	50	11.8	10.7	10.0	9.5	8.9	8.3	7.6	6.8	6.0	5.2	4.3	3.3	1.8								
	60	11.9	10.7	10.1	9.6	9.2	8.7	8.2	7.6	6.9	6.2	5.5	4.6	3.7	2.8	2.1	0					
	70	11.9	10.8	10.2	9.8	9.5	9.2	8.8	8.3	7.8	7.2	6.7	6.5	5.6	4.8	3.8	3.0	2.2	1.1			
80	12.0	10.9	10.3	10.0	9.8	9.6	9.3	9.0	8.6	8.2	7.9	7.6	7.2	6.8	6.2	5.5	4.5	3.6	2.5	1.3	0	